

be of sufficiently short duration to allow only a small decrease in velocity so that as high a speed as possible is maintained.

Following completion of the above described spin operation, which may have a duration of approximately one minute, the cycle of operations may include at least one repeat of the fill, tumble rinse, fluid draining, fabric distributing, and centrifugal extraction operations. During this portion of the series of operations, means may also be provided to dispense various fluid conditioners into the machine which in this preferred embodiment would include a conditioner dispenser solenoid 335 energized through timer contacts 265, 266 between power lines L₁ and N.

Instead of proceeding immediately into a fluid extraction operation following the final rinse operation, an improved antiadhesion operation including a spin impulse and a tumble impulse is provided to facilitate the release of fabrics from the inner wall of container 95 upon completion of the fluid extraction operation.

It has been found that when materials are evenly distributed around the inner periphery of the container and then submitted to high speed extraction for removing large quantities of fluids, the materials tend to stick to the walls of the container even after it has stopped or returned to tumble speed. To prevent this undesirable characteristic, which becomes more pronounced when a distribution operation is provided, an improved sequence of operations is instituted following the final rinse and drain operations, such as beginning in increment 33 of FIGURE 9. This procedure includes a short-duration, relatively high speed, spin impulse for removing substantial, but limited, quantities of fluids from fabrics.

As previously shown, motor 160 is operating to drive container 95 at a distribution velocity of approximately 60 r.p.m.; centrifugal switch 325 is thus in the closed position so that motor 161 is energizable for a spin operation. During the increment in which the spin impulse is desired, a subinterval switching mechanism, which is not specifically shown, but which is commercially available in sequence control mechanisms such as that driven by timing motor 239, is operative for actuating switch 336 to close contact pairs 339 and 340 for a momentary period of time. In this embodiment, contact pairs 339 and 340 are closed for approximately two seconds of the total increment time of one minute. During this increment, timer contacts 258, 259 and timer contacts 256, 257 are closed to effect energization of spin motor 161 upon closing of contact pairs 339 and 340 by a circuit as follows: power line L₁ through contact pairs 339 and 340, through timer contacts 258, 259, and through relay coil 319 to energize run winding 315. Upon energization of relay coil 319, starting switch 326 will close to contact 330 for energizing start winding 331. Since contact pairs 339 and 340 remain closed for only approximately two seconds, run winding 315 will be maintained energized for the balance of the spin impulse through conductor 341, switch 326 and timer contacts 256, 257. Start winding 331 is also energized through switch 326 made to contact 330.

It may therefore be seen that when motor 161 reaches a speed at which the current through relay coil 319 is insufficient to maintain switch 326 closed to contact 330, relay coil 319 will be deenergized for allowing switch 326 to close to contact 329 and for deenergizing motor 161. This switching speed occurs at approximately 1350 r.p.m. and corresponds to a basket speed of approximately 250 r.p.m. It is noted that the basket does not reach top speed; however, the speed and duration of the spin is sufficient to insure that a large portion of the water is removed from the materials contained therein but limited to an amount which will avoid tightly plastering the materials to the inner wall of the container.

Following this spin impulse, the container returns to distribution speed for the remainder of the instant increment. The motor 160 is then deenergized to allow the

container to come to a rest for one increment of timer advance and thereby allow the materials to fall free of the walls. During that increment of rest, however, means are provided for momentarily energizing motor 160 to rotate container 95 at least a portion of a revolution for providing an additional rest position to assist in removing the materials from the periphery of the basket and allowing them to fall free of their own weight. Motor 160 is energized by a circuit from power line L₁ through pulsing switch 336, timer contacts 259, 260, conductor 284, conductors 292 and 291 to pulsing switch 294. Motor 160 is energized for a momentary period of time, such as the two second period of time during which contact pairs 339 and 340 are closed.

It may therefore be seen that following the first spin impulse, at which time the container is allowed to come to a rest, the container will be oriented in a first position to allow fabrics which remain in the upper portion of the container to fall toward the bottom of the container. With a high degree of probability, the container will assume a different position following the momentary energization or tumble impulse and allow an additional portion of the material to fall toward the bottom of the container. This antiadhesion system is disclosed in greater detail in the copending application Serial No. 471,035 filed by John C. Mellinger on July 12, 1965, entitled Method and Apparatus for Centrifugal Extraction and assigned to the assignee of the instant invention.

The fluid extraction operation may include additional spin operations separated by a redistribution of fabrics. The additional spin operations might include a distribution portion, a spin portion, and a pause and tumble impulse portion, but could exclude the spin impulse. In the instant embodiment three additional spin operations are included as indicated in FIGURE 9. During the final spin operation, means are provided for optionally applying heat to the fabrics within the container 95. A heater 344 is energized only after motor 161 reaches switching speed for operating switch member 326 to contact 329. Closing of switch 326 to contact 329 completes a circuit from power line L₁ through conductor 341, switch 326 made to contact 329, switch 231, timer contacts 253, 254, conductor 345, switch 229, and through control thermostat 349 to relay coil 350. Energization of relay coil 350 operates switch 351 to the closed position for energizing heater 344 between power lines L₁ and L₂. Since heater relay 350 is energized through the back contacts of starting relay switch 326, which is responsive to speed of motor 161, and through centrifugal switch 325, which is responsive to speed of motor 160, heater 344 is energized only when both motors 160 and 161 are above their starting speed to insure that current limits do not exceed safe levels. This heat during the final spin portion is advantageous for improving the efficiency of fluid extraction and for pre-heating the fabrics prior to the drying operation.

If a "wash only" operation is selected at the beginning, the machine would, following the final spin in which heat was applied, proceed into a "cool off" period and then stop. During the "cool off" period motor 160 is operable for tumbling the fabrics for a period of approximately three minutes, for example.

If, however, a complete wash and dry operation is selected at the beginning, the machine proceeds to dry the materials within container 95 following the final spin. Motor 160 continues to tumble the fabrics by the circuit as previously indicated. Heater 344 is energized upon energization of relay coil 350, which has been energized by a circuit from power line L₁ through switch 230, timer contacts 254, 255, conductor 345, switch 229, control thermostat 349 and through centrifugal switch 325 to conductor 290. Energization of relay 350 closes switch 351 to energize heater 344 between power lines L₁ and L₂. After four minutes of heat on, for example, an automatic dry control termination means 354 is en-

Patentansprüche

1. Vorrichtung zum Schutz gegen Wasserschäden bei Geschirrspülmaschinen und dergl. mit einem Zulaufschlauch und einem diesen mit Abstand dicht umschließenden Hüllschlauch sowie mindestens einem steuerbaren, dem Zulaufschlauch vorgeschalteten Ventil, dadurch gekennzeichnet, daß der Raum zwischen Zulaufschlauch und Hüllschlauch maschinenseitig über einen Verbindungsschlauch mit dem Wasserbehälter der Maschine verbunden ist und mindestens ein, den Wasserstand in der Maschine und/oder Hüllschlauch erfassender Niveauwächter vorgesehen ist, durch den das vorgeschaltete Ventil bei Überschreiten eines vorgegebenen Niveaus geschlossen wird.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das dem Zulaufschlauch vorgeschaltete Ventil als elektromagnetisches Ventil ausgebildet ist, dessen Stromkreis über Schaltkontakte eines den Wasserstand in der Maschine erfassenden Niveauwächters geschleift ist.
3. Vorrichtung nach Anspruch 1 und 2, dadurch gekennzeichnet, daß das dem Zulaufschlauch vorgeschaltete Ventil als Doppelventil ausgebildet ist, das einerseits elektrisch zu öffnen und andererseits durch ansteigenden Druck im Hüllschlauch schließbar ist.
4. Vorrichtung nach den Ansprüchen 1 bis 3, dadurch gekennzeichnet, daß der Verbindungsschlauch mit Teilen nach Art eines Überlaufbogens oberhalb des maximal zulässigen Wasserstandes in der Maschine geführt ist.
5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß dem Hüllschlauch bzw. dem Verbindungsschlauch an einer tiefliegenden Stelle eine verschließbare Ablaßöffnung zugeordnet ist.
6. Vorrichtung nach den Ansprüchen 1 bis 5, unter Einsatz einer zusätzlichen, in der Maschine bodenseitig angeordneten Auffangwanne und einem dieser Wanne zugeordneten Schwimmer zur Erfassung anfallenden Leckwassers, dadurch gekennzeichnet, daß der Schwimmer direkt und/oder über den Niveauwächter auf das dem Druckschlauch vorgeschaltete steuerbare Ventil wirkt.

Beschreibung

Die Erfindung bezieht sich auf eine Vorrichtung zum Schutz gegen Wasserschäden bei Geschirrspülmaschinen oder dergl. mit einem Zulaufschlauch und einem diesen mit Abstand dicht umschließenden Hüllschlauch sowie mindestens einem steuerbaren, dem Zulaufschlauch vorgeschalteten Ventil.

Für wasserführende Haushaltgeräte, insbesondere Geschirrspülmaschinen, gibt es seit vielen Jahren eine Vielzahl von Vorschlägen, um die leider immer wieder vorkommenden Wasserschäden auszuschalten. Im Prinzip sind verschiedene Möglichkeiten gegeben, die zu Wasserschäden führen.

Einer der gefürchtetsten Schäden ist das Platzen des das Wassernetz mit der Maschine verbindenden Zulaufschlauches, was insbesondere dann passieren kann, wenn der Schlauch schon gealtert ist und ständig am Wasserleitungsnetz hängt. Bei häufig nachts auftretenden Druckspitzen platzt dann so ein Schlauch und das Wasser strömt ungehindert aus. Hierfür ist es bekannt, am Wasserhahn Ventile zu verwenden, die z.B. bei zu

geringem Gegendruck schließen und damit bei geplattem Schlauch den Schaden dadurch klein halten, daß das am Wasserhahn sitzende Ventil selbsttätig schließt. Eine andere bekannte Möglichkeit ist, das für die Wasserzufuhr zur Maschine ohnehin notwendige Ventil über eine parallel zum Wasserschlauch liegende elektrische Steuerleitung unmittelbar am Wasserhahn anzuschließen, also dem Wasserschlauch vorzuschalten. In einem solchen Fall ist der Wasserschlauch nur während der Zulaufphase unter Druck; die Gefahr eines Wasserschadens ist von vornherein stark gemindert.

Eine weitere Möglichkeit, bei geplattem Schlauch einen Wasserschaden zu verhindern, ist der Einsatz eines Hüllschlauches, der den eigentlichen Zulaufschlauch mit Abstand umschließt, in Kombination mit einem Leckwasserschwimmer oder einem druckgesteuerten Ventil. Ist der Hüllschlauch zwischen dem Wasseranschluß und der Maschine mit dem Zulaufschlauch dicht verbunden, dann wird beim Platzen des Zulaufschlauches im Hüllschlauch ein Druck aufgebaut, durch den ein am Wasserhahn sitzendes druckabhängiges Ventil gesperrt wird. Ist der Hüllschlauch nur einseitig am Wasserhahn dicht mit dem Zulaufschlauch verbunden, während das andere Ende offen im Maschinengehäuse endet, so kann das hier auslaufende Wasser in einer Leckwasserauffangwanne erfaßt und über einen Schwimmer ein Kontakt oder auch direkt ein Ventil gesteuert werden, das netzseitig den Zulaufschlauch vom Versorgungsnetz trennt. Mit der zuletzt genannten Ausführungsform kann über die Leckwasserauffangwanne und den Schwimmer auch eine Undichtigkeit innerhalb der Maschine bzw. der Verschlauchung erfaßt werden.

Der Erfindung liegt die Aufgabe zugrunde, folgende Schadenfälle mit geringem Aufwand gleichzeitig zu erfassen:

- a) das Platzen eines Zulaufschlauches,
- b) Überlaufen der Maschine,
- c) Undichtigkeiten zwischen Wasserversorgungsnetz und Maschine.

Erfindungsgemäß wird die gestellte Aufgabe dadurch gelöst, daß der Raum zwischen Zulaufschlauch und Hüllschlauch maschinenseitig über einen Verbindungsschlauch mit dem Wasserbehälter der Maschine verbunden ist und mindestens ein, den Wasserstand in der Maschine und/oder Hüllschlauch erfassender Niveauwächter vorgesehen ist, durch den das vorgeschaltete Ventil bei Überschreiten eines vorgegebenen Niveaus geschlossen wird.

Gegenüber der bekannten Ausführungsform mit gegenüber der Maschine offenem Hüllschlauch hat die Vorrichtung nach der Erfindung den Vorteil, daß schon geringe Lecks zwischen Versorgungsnetz und Maschine erfaßt und damit der Zulaufschlauch vom Versorgungsnetz abgetrennt wird. Zu einer Wasseransammlung in einer Leckwanne kommt es hier erst gar nicht. Die erfindungsgemäße Ausführungsform hat zudem den Vorteil, daß mit dem gleichen Ventil vor dem Zulaufschlauch auch ein Sicherheitsabschalter für ein überhöhtes Niveau in der Maschine gegeben ist.

Zur Ansteuerung des dem Zulaufschlauch vorgeschalteten Ventils kann ein elektromagnetisches Ventil dienen, dessen Stromkreis über Schaltkontakte eines den Wasserstand in der Maschine erfassenden Niveauwächters geschleift ist.

Für die Sicherheitsabschaltung kann vor den Zulauf-

energized and timer motor 239 is deenergized. This dry control system is responsive to direct determination of the dryness or electrical conductivity of the fabrics so as to obtain reliable shutoff of the drying operation. This control system includes a plurality of sensing members such as electrodes 355, 356 which are fastened to the front wall 74 of outer tub 24 openly facing and protruding into the interior of container 95. They are positioned so as to be contacted by tumbling fabrics but are spaced from wall 104 of container 95 to prevent contact by the fabrics while they are plastered to container 95 as during the extraction operation.

Electrodes 355 and 356 may be connected in the circuit as shown in FIGURE 8. Electrodes 355 and 356 have opposite polarity so that upon contact by fabrics the circuit may be completed therethrough. The sensing device is energized from line 289 through conductor 359 to a photoelectric cell 360 and half-wave rectifier 361. A D.C. circuit continues from rectifier 361 through resistor 364 to one side of neon tube 365, capacitor 366, and to electrode 356. When electrodes 355 and 356 are contacted by wet fabrics, a circuit is completed therebetween and continuing through resistor 369, conductor 370, contacts 269, 270, and to conductor 290. The conduction through the fabrics contacting electrodes 355 and 356 maintain the capacitor 366 discharged, neon tube 365 nonfiring, and photoelectric cell 360 nonconductive. As the fabrics become less wet the rate of discharge through the fabrics becomes lower and the net charge on the capacitor 366 increases toward that required for firing neon tube 365. This condition continues until the fabrics between electrodes 355 and 356 reach a predetermined condition of dryness at which they are substantially nonconductive.

The dry fabrics do not, therefore, effect a discharging of the capacitor 366 and it thus becomes gradually charged to a predetermined level for causing neon tube 365 to fire. Photoelectric cell 360 in turn becomes conductive for energizing relay coil 371 to close switches 379 and 380 for maintaining coil 371 energized and for bypassing open timer contacts 267, 268. Timing motor 239 is thereby energized for initiating termination of the drying operation. After completion of a period of "cool-off" controlled by the timing mechanism, the washer-drier will become deenergized and the basket will be allowed to come to a rest.

If, however, a load of fabrics remains adhered to wall 104 of container 95 following the fluid extraction operation, because of an abnormal load, for example, the adhered fabrics will not contact the electrodes and in the absence of conductive fabrics shorting the electrodes the system will ignore the dryness condition of the fabrics and allow capacitor 366 to charge and relay coil 371 to energize for initiating termination of the drying operation. This premature termination will prevent the drying or "baking" of the adhered fabrics.

Also, if a portion of a load of fabrics remains adhered to the container wall, the dry control termination system will sense the dryness of that portion of the load which is freely tumbling and contacting the electrodes 355 and 356 and will initiate termination of the drying operation at the predetermined condition of dryness of the tumbling fabrics while ignoring the condition of the adhered fabrics. This operation thus insures proper drying of tumbling fabrics while preventing drying or "baking" of adhered fabrics.

If a damp dry cycle is selected at the beginning of the washing operation, switch member 232 would have been closed to place resistors 374 and 375 in the circuit to effect a more rapid firing of capacitor 366 with a result that the fabrics would be less dry. Also, if a lower temperature is desired for the drying operation, switch 229 may be opened to place thermostat 346 in the circuit.

In summary it is seen that the instant application describes a washer-drier combination unit which has im-

proved features of operation including a unique two motor drive system for providing an improved cycle of operations to achieve improved fabric treatments.

This laundry apparatus includes a new combination of elements which have a cooperative interrelationship that achieves a degree of efficiency and consistency of results in washing and drying fabrics not heretofore realized in a single unit. This is a unit in which maximum fluid extraction is achieved through the provision for an assured distribution operation yet reduces the problems of fabrics adhering to the wall of the washing container through the provision for an antiadhesion operation. There is greater assurance that fabrics will tumble freely during the drying operation so as to achieve optimum performance of the automatic dry termination system. If, however, fabrics remain adhered to the wall, operation will be automatically interrupted. The plurality of speeds required for these specialized operations as well as for the tumble and extraction operations are all provided by a drive system including only two motors, a two-stage belt transmission, and an overrunning clutch under control of a sequence control mechanism.

In the drawings and specification, there has been set forth a preferred embodiment of the invention and, although specific terms are employed, these are used in a generic and descriptive sense only, and not for purposes of limitation. Changes in form and the proportion of parts, as well as the substitution of equivalents are contemplated, as circumstances may suggest or render expedient, without departing from the spirit or scope of this invention as further defined in the following claims.

I claim:

1. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing means on said base member; perforate container means mounted in said casing means for rotation about a nonvertical axis and having a wall member and an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds to perform said complete washing and drying cycle of operations; control means including sequencing means and circuit means cooperable therewith for selectively energizing said drive means to effect a series of operations including a final fluid extraction operation, and a tumble dry operation; and means for terminating said tumble dry operation including electrode means positioned in said container means operative for interrupting operation of said apparatus responsive to the absence of wet tumbling fabrics contacting said electrodes.

2. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing means on said base member; perforate container means mounted in said casing means for rotation about a non-vertical axis and having a wall member and an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds to perform said complete washing and drying cycle of operations; control means including sequencing means and circuit means cooperable therewith for selectively energizing said drive means to effect a series of operations including a final fluid extraction operation, and a tumble dry operation; means for terminating said tumble dry operation including electrode means positioned in said container means for selective response to a predetermined dry condition of the tumbling fabrics and to a condition of nontumbling of said fabrics during said tumble dry operation for initiating termination thereof.

schlauch auch ein rein druckabhängiges mechanisches Ventil treten, das den Druck im Hüllschlauch, der auch durch einen erhöhten Wasserstand in der Maschine gewonnen sein kann, erfaßt und bei einer bestimmten Druckhöhe das Ventil schließt.

Vorteilhaft ist es, das dem Zulaufschlauch vorgeschaltete Ventil als Doppelventil auszubilden, das einerseits über elektrische Kontakte geöffnet und geschlossen werden kann und andererseits auch durch ansteigenden Druck im Hüllschlauch schließbar ist.

Der Verbindungsschlauch zwischen dem Hüllschlauch und dem Wasserbehälter der Maschine wird vorteilhaft z.B. U-förmig derart geführt, daß er mit Teilen nach Art eines Überlaufbogens oberhalb des maximal zulässigen Wasserstandes in der Maschine geführt ist. Hierdurch wird ein sonst notwendiges Rückschlagventil zwischen Wasserbehälter und Hüllschlauch eingespart, ohne daß sich an den für die Steuerung der Ventile benutzten Druckverhältnissen im Hüllschlauch etwas ändert.

Damit bei einem Störfall, z.B. einer geringen Leckage, die Betriebsbereitschaft wieder hergestellt werden kann, ist es vorteilhaft, dem Hüllschlauch bzw. dem Verbindungsschlauch an einer tiefliegenden Stelle eine verschließbare Ablaßöffnung zuzuordnen.

Anhand der Zeichnung sei ein Ausführungsbeispiel der Erfindung beschrieben und die Wirkungsweise in Ergänzung der vorstehenden Ausführungen erläutert.

Die Figur zeigt in schematischer Darstellung einen Geschirrspüler 1, in dessen Behälterwanne 2 für den Betrieb bis maximal zum gestrichelt eingezeichneten Niveau 3 Wasser eingefüllt wird. Der Füllvorgang erfolgt über den Wasserhahn 4, das elektrische Ventil 5, das druckabhängige mechanische Ventil 6, den Zulaufschlauch 7, die Verbindung 24 innerhalb der Maschine und den Wasserzulauf 9 mit der Luftstrecke 10 sowie den Ionenaustauscher 11 in den Sumpf 12 des Behälters 2. Ein zum Ionenaustauscher gehörender Salzbehälter ist mit 13 bezeichnet. Der Sumpf 12 kann über eine Laugenpumpe 14 und einen Abwasserschlauch 15 entleert werden.

Um den Zulaufschlauch 7 ist ein Hüllschlauch 8 so gelegt, daß er mit einem die Ventile 5 und 6 einschließenden Gehäuse 16 einen abgeschlossenen Raum bildet, der über den Verbindungsschlauch 17 mit einem Windkessel 18 für einen Niveauwächter 19 und damit mit dem Sumpf 12 der Maschine verbunden ist. Der Verbindungsschlauch 17 ist über eine U-förmige Schleife 20 so in der Maschine gelegt, daß der Überlaufbogen oberhalb eines maximal zulässigen Wasserstandes liegt.

Zur Erfassung von Undichtigkeiten in der Maschine und an der Verschlauchung ist bodenseitig im Maschinengehäuse eine Leckwasserauffangwanne 21 angeordnet. Über einen Schwimmer 22 wird das in der Wanne 21 anfallende Wasser erfaßt und über ein Gestänge 23 dann der Niveauwächter 19 ebenso gesteuert wie vom Druckanstieg im Windkessel 18. Wird der Schwimmer 22 angehoben, so unterbricht der Kontakt 19 und schließt damit das elektrische Ventil 5.

Steigt das Niveau im Behälter 2, dann baut sich im Windkessel ein Druck auf, der bei vorgegebener Größe ebenfalls einen der Kontakte des Niveauwächters 19 öffnet, wodurch das Ventil 5 ebenfalls geschlossen wird.

Sollte das Ventil 5 bei Überschreiten eines Betriebsniveaus nicht geschlossen werden, so steigt nicht nur der Druck im Windkessel 18 weiter an, sondern auch in der Verbindungsleitung 17 und damit im Hüllschlauch 8. Durch diesen Druckanstieg wird unabhängig vom Ven-

til 5 das druckabhängige, mechanisch arbeitende Ventil 6 geschlossen.

Es ist ersichtlich, daß dieser Mechanismus auch dann greift, wenn an den Ventilen 5 und 6 oder im Zulaufschlauch 7 ein kleines Leck auftritt, denn auch in diesem Fall sammelt sich im Hüllschlauch 8 Wasser und erhöht damit den Druck auf das mechanische Ventil 6, das geschlossen wird. Der hochgezogene Teil 20 des Verbindungsschlauches 17 bestimmt den Wasserstand im Hüllschlauch 8, ehe das Leckwasser in den Behälter 2 übertreten kann.

Die Vorrichtung nach der Erfindung kann selbstverständlich um weitere zusätzliche Sicherheitseinrichtungen, insbesondere zusätzliche Ventile ergänzt werden. So kann das Ventil 5 als Doppelventil ausgebildet sein derart, daß nur dann Wasser zum Zulaufschlauch 7 kommt, wenn beide Ventile elektrisch gleichzeitig geöffnet sind. Das druckabhängige Ventil 6 kann so ausgebildet werden, daß es nur vom Service in den Öffnungszustand zurückgebracht werden kann; man kann aber eine Rückstellung auch über eine elastische Membran im Ventil 6 zulassen. Vorteilhaft kann es sein, den Hüllschlauch oder den Verbindungsschlauch mit einer abschließbaren Ablaßöffnung zu versehen, um damit Druck im Hüllschlauch ablassen zu können.

Das System bietet zusätzlich den Vorteil, daß bei Fehlern im Niveausystem das System durch den Abpumpvorgang reaktiviert wird und daß bei platzendem oder undichtem Zulaufschlauch die Abschaltung bestehen bleibt.

Durch die Anordnung der Ventile vor dem Zulaufschlauch braucht dieser wegen des weitgehend freien Auslaufes zur Maschine nicht als Druckschlauch ausgebildet sein.

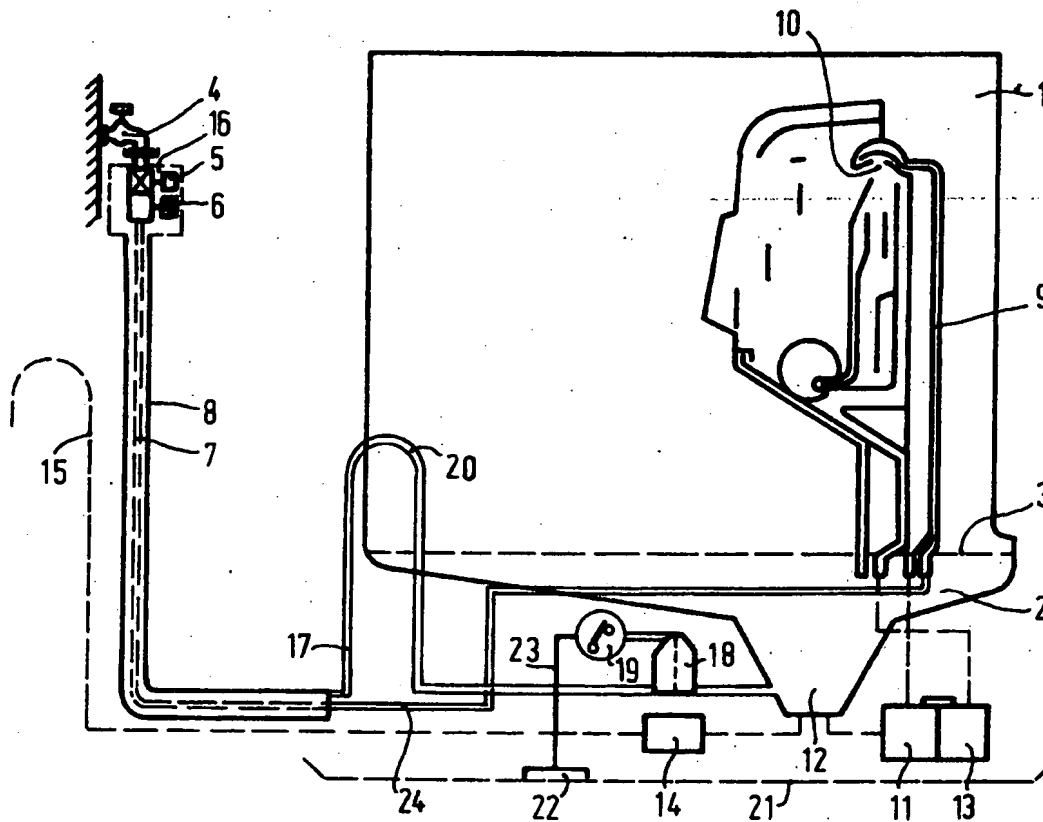
3. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing means on said base member; perforate container means mounted in said casing means for rotation about a nonvertical axis and having a circumferential wall member radially disposed from said axis and further having an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds to perform said complete washing and drying cycle of operations; control means including sequencing means and circuit means cooperable therewith for selectively energizing said drive means to effect a series of operations including a final fluid extraction operation, and a tumble dry operation; said control means being further operative for energizing said drive means for first accelerating said container means toward a spin speed prior to said final extraction operation to remove limited quantities of fluids and then effecting stopping of said container in a first position and then a second position to improve releasability of fabrics from said wall member; and means for terminating said tumble dry operation including electrode means positioned in said container means and inwardly spaced from said wall member thereof for contact by said fabrics when said fabrics are tumbling and responsive to noncontact by nontumbling wet fabrics for initiating termination of said tumble dry operation to achieve drying of said tumbling fabrics to a predetermined dry condition while substantially preventing drying of fabrics adhering to said container wall member.

4. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing means on said base member; perforate container means mounted in said casing means for rotation about a nonvertical axis and having a circumferential wall member radially disposed from said axis and further having an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds to perform said complete washing and drying cycle of operations, said drive means comprising belt transmission means including a first stage speed reduction means and a second stage speed reduction means, clutch means operatively located between said first and said second stage speed reduction means, first motor means drivingly connected to said first stage speed reduction means and operative for driving said container means at a relatively slow speed through said first and second stage speed reduction means and said clutch means, pulsing means for cyclically energizing said first motor means to drive said container means at a speed relatively close to said slow speed, and second motor means drivingly connected through said clutch means for driving said second stage speed reduction means and thereby said container means at at least one relatively fast extraction speed whereby said container means is operable at at least three speeds including tumble, distribution, and extraction; control means including sequencing means operative for programming said laundry apparatus through a predetermined series of operations including a tumble wash operation, a distribution operation, a final extraction operation, and a tumble dry operation; means included in said control means for energizing said second motor to accelerate said container toward a relatively high spin speed for removing limited quantities of fluids prior to said final extraction operation; and means for terminating said tumble dry operation including electrode means positioned for contact by said tumbled fabrics and respon-

sive to noncontact by nontumbling wet fabrics for initiating termination of said tumble dry operation.

5. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing means on said base member; perforate container means mounted in said casing means for rotation about a non-vertical axis and having a circumferential wall member radially disposed from said axis and further having an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds to perform said complete washing and drying cycle of operations, said drive means including a first and a second motor connected to said container means by a pair of alternate drive paths; control means including sequencing means and circuit means cooperable therewith for selectively energizing said first and second motors to effect a series of operations including a timed distribution operation, a final fluid extraction operation, and a tumble dry operation, said circuit means further including switch means operable for initiating energization of said second motor prior to said final extraction operation for accelerating said container toward a relatively high spin speed for removing limited quantities of fluids; means responsive to operation of said second motor at said relatively high spin speed for interrupting energization thereof and effecting stopping of said container in a first position, said switch means being then operative for energizing said first motor for a short period of time to rotate said container means from said first position to a second position whereby said container means is stopped at a plurality of positions at which the fabrics may fall free from the upper portion of said container means; and means for terminating said tumble dry operation including electrode means positioned in said container means spaced from said wall member thereof for contact by said tumbling fabrics and spaced from said fabrics when said fabrics are positioned as during the extraction operation, said termination means being responsive to a predetermined condition of dryness of said tumbling fabrics for initiating termination of said drying operation.

6. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing on said base member; perforate container means rotatably mounted in said casing means and having an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds to perform said complete washing and drying cycle of operations, said drive means comprising transmission means having a first stage speed reduction means and a second stage speed reduction means, clutch means operatively located between said first and said second stage speed reduction means, first motor means drivingly connected to said first stage speed reduction means and operative for driving said container means at a relatively slow speed through said first and second stage speed reduction means and said clutch means, means associated with said first motor means for cooperating therewith to selectively drive said container means at a speed relatively close to said slow speed, and second motor means drivingly connected to said second stage speed reduction means and operative for driving said container means at at least one relatively fast extraction speed; sequencing means operative for programming said laundry apparatus through a predetermined series of operations including distribution operation, a final extraction operation, and a tumble dry operation; means for energizing said second motor to accelerate said container to



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of said tumbling fabrics and to a condition of non-tumbling of said fabrics during said tumble dry operation for interrupting operation of said laundry apparatus.

10. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing means on said base member; perforate container means mounted in said casing means for rotation about a nonvertical axis and having a wall circumferential member and an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means including electric heating means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds to perform said complete washing and drying cycle of operations, said drive means including a first motor energizable for rotating said container means at at least one relatively slow speed for tumbling said fabrics and further including a second motor for rotating said container means at at least one relatively high speed for extracting fluids from said fabrics; control means included in said control means and including relay programming said laundry apparatus through a series of operations including a distribution operation, a final fluid extraction operation, and a tumble dry operation, said control means including first circuit means for energizing said first motor to rotate said container means at a relatively slow speed and further including second circuit means having means responsive to operation of said first motor above a predetermined speed for effecting energization of said second motor; and third circuit means including in said control means and including relay means in parallel connection to said second motor and in series connection to said speed responsive means to insure operation of said electrical heating means only after said second motor is operating above a predetermined speed, means for substantially preventing fabric adhesion to said wall member; and means for terminating said tumble dry operation including electrode means positioned in said container means operative for interrupting operation of said apparatus selectively responsive to a condition nontumbling of said fabrics during said tumble dry operation and to a predetermined dry condition of tumbling fabrics for initiating termination of said tumble dry operation.

11. In a laundry apparatus for performing a complete washing and drying cycle of operations, the combination comprising: a base member; casing means; means for supporting said casing means on said base member; perforate container means mounted in said casing means for rotation about a nonvertical axis and having a circum-

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ferential wall member radially disposed from said axis and an access for receiving fabrics to be washed and dried therein; means for providing washing fluids to said container means; means for drying fabrics in said container means; drive means for rotating said container means at a plurality of speeds, said drive means comprising first motor means and including first pulley means drivingly fixed thereto, second motor means having a shaft member extending therefrom, second pulley means rotatably mounted on said shaft member, third pulley means drivingly fixed to said shaft member, clutch means for rotating said third pulley means with said second pulley means, first belt means drivingly coupling said first and second pulley means to form a first stage speed reduction means, and second belt means driven by said third pulley means and drivingly associated with said container means to form a second stage speed reduction means; first means for energizing said first motor means for driving said container means at a plurality of relatively slow speeds through a first drive path including said first stage speed reduction means, said clutch means, and said second stage speed reduction means; second means for selectively energizing said second motor means for driving said container means at at least one relatively fast speed through a second drive path including said second stage speed reduction means; means for substantially preventing fabric adhesion to said wall member; and means for terminating said tumble dry operation including electrode means positioned in said container means operative for interrupting operation of said apparatus responsive to a condition of nontumbling of said fabrics during said tumble dry operation and to a predetermined dry condition of said tumbling fabrics for initiating termination of said tumble dry operation.

12. In a laundry apparatus as defined in claim 11 and wherein said first energizing means is operable for controlling said first motor to effect operation at a first speed under steady energization and to effect operation at a second speed under pulsing energization.

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WILLIAM I. PRICE, *Primary Examiner*.

DERWENT- 1987-236082

ACC-NO:

DERWENT- 198734

WEEK:

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TITLE: Dishwasher leak prevention appts. - has water supply cut=off valve controlling by float detecting level in outer shell tube or inside casing rises

INVENTOR: DEGEL, J; GUMM, M

PATENT- BAUKNECHT HAUSGERAETE GMBH[BAUKN] , N V PHILIPS GLOEILAMPENF[PHIG] ,
ASSIGNEE: WHIRLPOOL INT BV[WHIR]

PRIORITY-DATA: 1986DE-3604673 (February 14, 1986)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
DE <u>3604673</u> A	August 20, 1987	N/A	005	N/A
DE 3780325 G	August 20, 1992	N/A	000	A47L 015/42
EP 234643 A	September 2, 1987	G	000	N/A
EP 234643 B1	July 15, 1992	G	006	A47L 015/42
ES 2033795 T3	April 1, 1993	N/A	000	A47L 015/42

DESIGNATED-STATES: CH DE ES FR IT LI SE CH DE ES FR IT LI SE

CITED- A3...198746; DE 2023299 ; DE 2817001 ; DE 2947433 ; DE 3014427 ; DE 3133349 ;
DOCUMENTS: DE 3425589 ; DE 3425663 ; EP 5197 ; GB 2161501 ; No-SR.Pub ; US 3779273

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
DE 3604673A	N/A	1986DE-3604673	February 14, 1986
DE 3780325G	N/A	1987DE-3780325	February 11, 1987
DE 3780325G	N/A	1987EP-0200217	February 11, 1987
DE 3780325G	Based on	EP 234643	N/A
EP 234643A	N/A	1987EP-0200217	February 11, 1987
EP 234643B1	N/A	1987EP-0200217	February 11, 1987
ES 2033795T3	N/A	1987EP-0200217	February 11, 1987
ES 2033795T3	Based on	EP 234643	N/A

INT-CL (IPC): A47L015/42, D06F039/08

ABSTRACTED-PUB-NO: DE 3604673A

BASIC-ABSTRACT:

An input tube (7) is surrounded by a spaced outer tube (8) and the space between them is coupled on the dishwasher side via a connection tube (17) with the water container of the dishwasher. A level sensor (19) monitors the level of waste in the machine and/or the outer tube and turns off the supply to an electrically controlled valve (5) when a given level is exceeded.

The connection tube (17) may have an inverted 'U'-section (20) and a float (22) may be provided on the inner wall of the casing of the dishwasher so as to directly control the valve in the event of leaks within the machine, or to control it via the level sensor (23).

ADVANTAGE - Completely safe.

ABSTRACTED-PUB-NO: EP 234643B

EQUIVALENT-ABSTRACTS:

Apparatus to prevent water damages with a domestic appliance, e.g. a dishwasher or the like, with a supply hose (7) surrounded by and spaced from a jacket hose (8) which via a connecting hose (17) is connected to the tub (2) of the appliance, with a controllable valve (5, 6) upstream of the supply hose (7) and with a level sensor (19) for sensing the water level in the tub (2) in order to actuate the valve (5,6) characterised in that: a) the jacket hose (8) together with housing (16) forms a closed space and that a part (20) of the connecting hose is conducted in the form of an overflow loop above the highest acceptable water level in the appliance. b) The valve (5,6) is formed by an electrically and pneumatically controllable double valve, the electrical part (5) of which being directly actuatable via switch-contacts of the level sensor and the pneumatical part being directly actuatable by the pressure in the jacket hose (8).

DE 3780325G

An input tube (7) is surrounded by a spaced outer tube (8) and the space between them is coupled on the dishwasher side via a connection tube (17) with the water container of the dishwasher. A level sensor (19) monitors the level of waste in the machine and/or the outer tube and turns off the supply to an electrically controlled valve (5) when a given level is exceeded.

The connection tube (17) may have an inverted 'U'-section (20) and a float (22) may be provided on the inner wall of the casing of the dishwasher so as to directly control the valve in the event of leaks within the machine, or to control it via the level sensor (23).

ADVANTAGE - Completely safe.

CHOSEN-DRAWING: Dwg.1/1 Dwg.1/1i

TITLE-TERMS: DISHWASHER LEAK PREVENT APPARATUS WATER SUPPLY CUT-OFF VALVE CONTROL FLOAT
DETECT LEVEL OUTER SHELL TUBE CASING RISE

DERWENT-CLASS: P28 X27

EPI-CODES: X27-D01B;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N1987-176531

PUB-NO: DE003644053A1
DOCUMENT- DE 3644053 A1
IDENTIFIER:
TITLE: Dishwasher, washing machine or the like, with a collecting trough for
leaking water

PUBN-DATE: June 30, 1988

INVENTOR-INFORMATION:

NAME	COUNTRY
HETTENHAUSEN, ULRICH DIPL ING	DE

ASSIGNEE-INFORMATION:

NAME	COUNTRY
MIELE & CIE	DE

APPL-NO: DE03644053

APPL-DATE: December 22, 1986

PRIORITY-DATA: DE03644053A (December 22, 1986)

INT-CL (IPC): A47L015/42 , D06F039/00

EUR-CL (EPC): D06F039/08

US-CL-CURRENT: 134/56D , 134/58D

ABSTRACT:

CHG DATE=19990617 STATUS=O> In a dishwasher, washing machine or the like, with a collecting trough for leaking water which is arranged at the bottom of the appliance housing underneath the functional units such as pumps, solenoid valves, pressure control devices and the like, one or more floatable protective coverings for the functional units are arranged in the collecting trough. It is thus possible, even with a small clearance between the functional units of the appliance and the bottom of the collecting trough, to catch relatively large amounts of leaking water without the functional units coming into contact with the leaking water. At the same time, the proposed measure provides optimum protection for the functional units against leaking water.